U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center
Honolulu and La Jolla Laboratories
P. O. Box 3830
Honolulu, Hawaii 96812

August 1, 1975

TO ALL PARTICIPANTS IN THE SEVENTEENTH
HAWAIIAN INTERNATIONAL BILLFISH TOURNAMENT

The National Marine Fisheries Service is happy to join you in participating in the Seventeenth Hawaiian International Billfish Tournament. As in the past we will be there to perform scientific tasks. I ask your assistance in obtaining the scientific benefits from this outstanding sports fishing event.

We shall continue our shoreside research and ask your permission to make measurements and to cut open your catch for various examinations. Be assured that we will not touch any fish without your permission, nor will we touch it until it has been officially weighed and recorded. If you wish to mount any portion of your prize, all care will be taken not to mar it.

We plan to put up an exhibit at Tournament headquarters. The exhibit is about fish resources and the work of the National Marine Fisheries Service. Frankly, the exhibit is not as complete as we had intended it to be. I hope you find it informative nonetheless.

Heeny Yuen and Ray Sumida will be handling our activities at the Tournament. If you have questions on the biology of billfishes or tunas or the work of the National Marine Fisheries Service, I invite you to try your questions on them wherever you find them.

Attached is our report of last year's Tournament. You may find certain sections in it interesting for your strategy decisions. Other attachments are graphs from which you can estimate a fish's weight by measuring its total length (tip of bill to fork of tail). These graphs, derived from hundreds of measurements, depict the average condition. The fish that you catch will probably vary somewhat from the graph, especially if it is a very large fish.

Thank you very much for your cooperation. Good fishing in the Tournament.

Richard S. Shomura
Director, Honolulu Laboratory

Attachments

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TO ALL BILLFISHERS:

The National Marine Fisheries Service, NOAA, has contributed its scientific skills to the Hawaiian International Billfish Tournament (HIBT) and issued reports on its findings for 13 consecutive years. Here again is our traditional report (if you will permit it to be considered traditional after 13 years).

This is the first year that I participated in the HIBT from beginning to end. The spirit of cooperation and community involvement throughout the tournament was truly enjoyable to experience. Bernard Ito, Ray Sumida, Cynthia Unninayar, and I of the National Marine Fisheries Service express our heartfelt thanks to all the anglers, the tournament officials, and the community volunteers for their assistance and the wonderful experience.

The Sixteenth Annual Hawaiian International Billfish Tournament was an unqualified success from the very impressive opening ceremonies through the final awards banquet. It was highlighted by several records. The catch of 110 qualifying fish is the highest ever for any HIBT event. Haku Baldwin's ahi (yellowfin tuna) of 222 pounds on 80-pound test line set a new world's record for women. Neil Nishikawa's feat of landing a Pacific blue marlin of 762 pounds on 50-pound test line also broke a world's record. Congratulations!

THE CATCH

Making up the record catch of 110 fish were 66 Pacific blue marlin, 35 ahi, 6 shortbill spearfish, 2 black marlin, and 1 striped marlin. The first shortbill spearfish appeared in the tournament 3 years ago. The six caught this year are the most ever caught at the HIBT. The black marlin are also noteworthy. Their appearance in the tournament this year terminates an absence of 5 years.

Sixty-four teams of anglers participated in this year's tournament. Their catch of 110 fish calculates out to 2.9 boat-days per fish. If this figure is adjusted for the shortening of the fishing day from 9 hours to 8 hours, the result is 2.5 boat-days per fish. This rate is 20% better than the previous best of 3.1 boat-days per fish (Table 1).

Sex determinations were made on 60 of the Pacific blue marlin. There were 46 males and 14 females, for a male:female ratio of 3.3:1. Sex ratios of Pacific blue marlin in past tournaments (Table 2) have ranged from 1.2 to 8.0:1, with most of them falling between 2:1 and 3:1.

The weight ranged from 127 pounds to 247 pounds for the males and from 86 pounds to 762 pounds for the females. The 86-pound female is a record breaker of dubious distinction. She is the smallest identified female Pacific blue marlin in HIBT records.

AREAS OF STRIKES AND CATCHES

The most popular fishing area was area I, with 425 boat-hours of fishing for the tournament period. Other areas of heavy fishing pressure in order of popularity were: T, J, U_A, L, K, V, and U_B. Area J provided the most billfishes, with 14 Pacific blue marlin and 1 shortbill spearfish (Table 3). Area T followed with 12 Pacific blue marlin and 1 shortbill spearfish. Area I was third with nine Pacific blue marlin and two black marlin. It is interesting to note that the five leading areas for Pacific blue marlin are areas adjacent to the coast. In fact, 53 of the 66 Pacific blue marlin landed were caught in areas adjacent to the coast.

The largest marlins were caught in areas V and I. The average weight of the Pacific blues caught in areas V and I far exceeded the average weights of the other areas (Table 3). Those caught in area V averaged 419 pounds and those in area I averaged 324 pounds. Compare these averages to the overall average of 224 pounds per Pacific blue marlin. The five blue marlin caught in area V weighed more than all 12 from area T!

Strike rates were calculated for those areas in which there were more than 100 boat-hours of fishing during the tournament (Figure 1). The three top areas were area L with 0.37 strike per boat-hour, area U_B with 0.28, and area J with 0.25.

Reasoning that there must be a correlation between strike rates and catch rates because each catch starts as a strike, I plotted the catch rates against the strike rates (Figure 2). The distribution of points on the plot indicates no correlation at all between strike rates and catch rates. In other words, one is just as likely to catch a fish in an area of low strike rate as in an area of high strike rate. This is an enigma to me, but perhaps if I thought like a fish I would see it clearly.

FISHING TACKLE

Tournament fishermen are evidently making better use of the fish caught as far as points are concerned. Since 1970 the use of 130-pound test line has continually decreased (Figure 3) as more and more fishermen are taking advantage of the bonuses offered for catches on light tackle. In 1970, 67% of the fish were caught on 130-pound test; in 1974 only 10%

were caught on 130-pound test. The percentage of fish caught on 80-pound test has increased steadily from 21% in 1970 to 56% in 1974. The rise in percentage of fish caught on 50-pound test from 13% in 1970 to 34% in 1974 was not as consistent as that for 80-pound test. There was a slight decline in 1973, but a sharp increase was witnessed in 1974.

The graph at the top of Figure 3 shows the percentage of hookups that were landed for the last 5 years. In spite of the tendency towards light tackle the proportion of hookups landed has not decreased. Nor has lighter tackle resulted in smaller fish. The frequency distribution of marlin weights for the three different tackles (Figure 4) shows the same pattern for 80-pound test and 50-pound test lines. In view of this I would venture to guess that in a few years 130-pound tackle will not be used at all in the HIBT.

Year after year for 10 years now the strike rates have been superimposed on tide charts as in Figure 5. The relationship between strike rates and tidal phase, if any, remains unclear. In the last 5 years the tournament has been scheduled to coincide with the new moon with dramatic results (Table 1). In 1973 and 1974 whenever a fishing period (equivalent to a radio report period) occurred during low tide, that period had the highest strike rate for the day. In Table 4a I have summarized the tide phase rankings based on strike rates for the last 5 years (1970-1974 inclusive). The strike rates at low water slack tide ranked first in 3 years and second in 2 years. The strike rates during flood tide periods ranked first 1 year and last in 4 years. High water slack tide ranked second in 1 year and last in another. Ebb tide ranked first in 1 year and second in 2 years. From Table 4a low water slack tide appears to be the best time for strikes and flood tide the worst. From 1965 to 1969, when tournaments were not scheduled according to moon phase, a similar summary (Table 4b) shows that strike rates were best during ebb tide. Data in the next few years should result in a decision on whether or not strike rates are related to tide phases.

STOMACH CONTENTS

Fishes of the tuna family were the most common food item found in marlin stomachs this year. They occurred in 45% of the stomachs examined. This occurrence rate of tunas is higher than any recorded for the HIBT in the past. The two dominant species of tunas were skipjack tuna in 20% of the stomachs and frigate mackerel in 18% of the stomachs. The next most common on the list of food items (Table 5) was squid, which was found in 22% of the stomachs. Opelu, a mackerel scad, was also a popular item with an occurrence of 18%. Over the years tunas, squid, and opelu have been the mainstay of the diet of marlins during the tournament. Twenty-two percent of the stomachs were empty.

The stomach contents included a juvenile scorpionfish and a blade of seaweed, items never seen in marlin stomachs in past tournaments. On the other hand, goatfish juveniles were notably missing. The earliness of this year's tournament may have been a factor in their absence as these juveniles usually enter the coastal waters during August and September.

I enjoyed meeting you. Until next year, aloha and good fishing.

Heeny S. H. Yuen

Heeny S. H. Yuen
Fishery Biologist

September 12, 1974

Attachments

Table 1.--Numbers of qualifying game fish landed and teams fishing during Hawaiian International Billfish Tournaments, 1962-74.

Year	Blue marlin	Black marlin	Striped marlin	Shortbill spearfish	Sailfish	Yellowfin tuna ≥ 100 lb.	Total qualifying fish	Number of teams	Number of boat-days fishing per fish
1962	30	1	—	--	1	19	51	68	6.7
1963	19	2	1	—	—	26	48	72	7.5
1964	31	--	1	—	—	2	34	69	10.1
1965	47	—	—	—	—	9	56	78	6.9
1966	26	3	2	--	—	7	38	72	9.5
1967	63	--	1	—	—	18	82	68	4.2
1968	36	2	4	--	--	4	46	85	9.2
1969	32	1	--	--	--	4	37	75	10.1
1970	91	—	2	--	2	14	109	73	3.3
1971	41	—	3	1	--	47	92	77	3.4
1972	77	--	--	--	—	11	88	59	3.4
1973	76	--	1	3	1	17	98	61	3.1
1974	66	2	1	6	--	37	110	64	2.5

Table 2.--Sex ratios for blue marlin, Makaira nigricans, examined from Hawaiian International Billfish Tournaments, 1962-74.

Year	Number of males	Number of females	Ratio males to females
1962	16	7	2.3:1
1963	13	6	2.2:1
1964	14	12	1.2:1
1965	35	8	4.4:1
1966	16	8	2.0:1
1967	51	13	3.9:1
1968	24	10	2.4:1
1969	23	8	2.9:1
1970	63	14	4.5:1
1971	21	9	2.3:1
1972	64	8	8.0:1
1973	47	21	2.2:1
1974	46	14	3.3:1

Table 3.--Number of fish caught in 1974 tournament by species, date, and area.

Date	Area												
	C	I	J	K	L	M	N_A	N_B	S	T	U_A	U_B	V
Pacific blue marlin													
July 15	--	--	2	1	3	--	--	--	1	1	1	2	--
July 16	1	1	2	--	--	--	--	--	1	2	1	2	--
July 17	--	3	6	1	--	--	--	--	--	1	--	--	--
July 18	1	4	3	1	--	--	--	--	2	4	1	--	4
July 19	--	1	1	1	1	1	1	1	2	4	--	--	1
Total	2	9	14	4	4	1	1	1	6	12	3	4	5
Average weight	123.0	323.9	189.6	213.8	195.8	136.0	162.0	182.0	229.3	162.9	170.0	221.8	419.2
Ahi													
July 15	--	1	1	--	--	--	--	--	--	1	--	--	--
July 16	--	3	1	2	--	--	--	--	--	--	--	--	--
July 17	--	3	2	--	--	3	1	--	2	--	1	1	--
July 18	--	2	--	--	1	--	--	--	1	--	2	1	1
July 19	--	--	1	--	--	--	--	1	--	--	--	--	--
Total	--	9	5	2	1	3	1	1	3	1	3	2	1
Average weight	--	159.2	183.2	155.0	111.0	217.3	217.0	120.0	136.7	170.3	200.7	189.0	199.0
Other*													
July 15	--	BM	--	--	SS	SS	--	--	--	--	--	--	--
July 16	--	--	--	--	--	--	--	--	--	--	--	--	--
July 17	--	--	--	--	--	--	--	--	--	--	--	SS	SM
July 18	--	BM	--	--	SS	--	--	--	--	SS	--	--	--
July 19	--	--	SS	--	--	--	--	--	--	--	--	--	--
Total	--	2	1	--	2	1	--	--	--	1	--	1	1
Average weight	--	342.5	26.0	--	23.5	29.0	--	--	--	34.0	--	42.0	35.0

*One fish caught in each cell marked by symbol; BM = black marlin, SM = striped marlin, SS = shortbill spearfish.

Table 4.--Number of years strike rates of tide phases fell in various ranks.

a. 1970-74 inclusive

	Strike rate rank		
Tide phase	1	2	3
Low-water slack	3	2	-
Flood	1	-	4
High-water slack	-	1	1
Ebb	1	2	-

b. 1965-69 inclusive

	Strike rate rank			
Tide phase	1	2	3	4
Low-water slack	-	2.5*	2.5*	-
Flood	-	2.5*	1.5*	1
High-water slack	2	-	1	-
Ebb	3	-	-	1

*Tie in rankings 1 year.

Table 5.--Stomach contents of Pacific blue marlin, Makaira nigricans, from the Hawaiian International Billfish Tournament, 1974

Food items	Date and number of stomachs containing listed food items					Percent occurrence
	7/15	7/16	7/17	7/18	7/19	
Fish						
Tuna, Scombridae						45
Skipjack tuna, Katsuwonus pelamis	2	1	3	3	1	20
Frigate mackerel, Auxis sp.	1	1	2	4	2	18
Unidentified	1	-	2	2	-	10
Jacks, Carangidae						20
Opelu, Decapterus pinnulatus	1	1	1	4	2	18
Akule, Trachurops crumenophthalmus	-	1	-	-	-	2
Mahimahi, Coryphaenidae	-	-	1	1	1	6
Pelagic spiny puffer, Diodontidae	2	2	-	1	1	12
Puffer, Tetraodontidae	-	-	-	1	-	2
Triggerfish, Balistidae	-	-	-	-	2	4
Surgeonfish, Acanthuridae	-	-	1	1	-	4
Lancetfish, Alepisauridae	-	1	1	2	1	10
Snake mackerel, Gempylidae	-	3	-	-	1	8
Butterflyfish, Chaetodontidae	-	-	2	-	-	4
Scorpionfish, Scorpaenidae	-	-	-	1	-	2
Cowfish, Ostraciontidae	-	-	-	1	-	2
Unidentified fish	3	3	4	7	4	43
Invertebrates						
Squid, Decapoda	3	3	1	-	4	22
Empty or everted stomachs	1	3	1	5	1	22
Number of stomachs examined	8	8	11	15	7	
Total: 49						

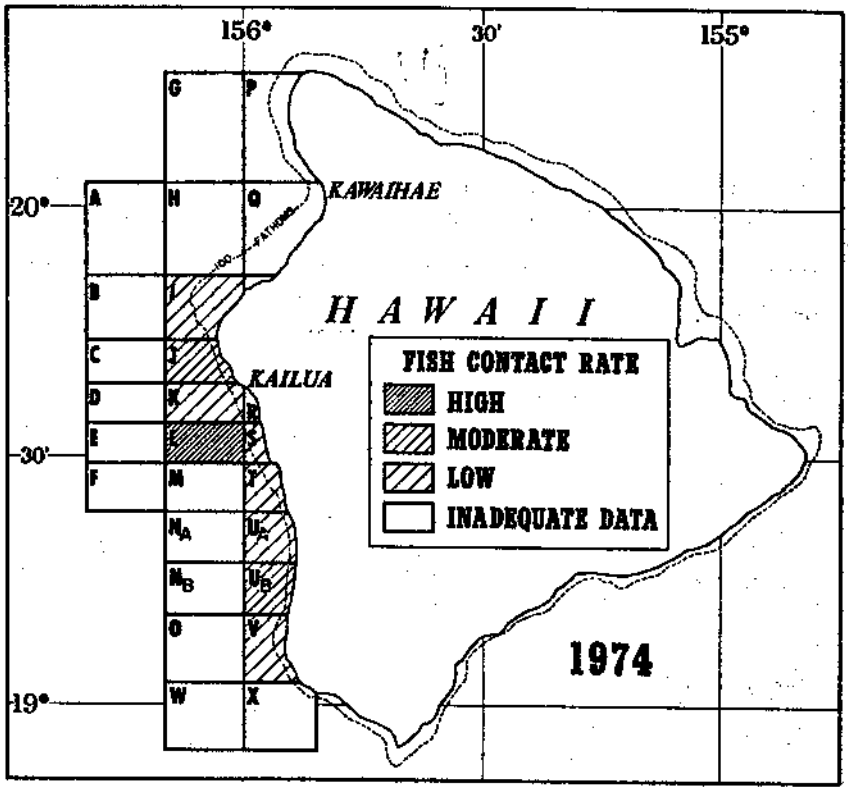


Figure 1.--Fish contact rates in the various fishing areas.

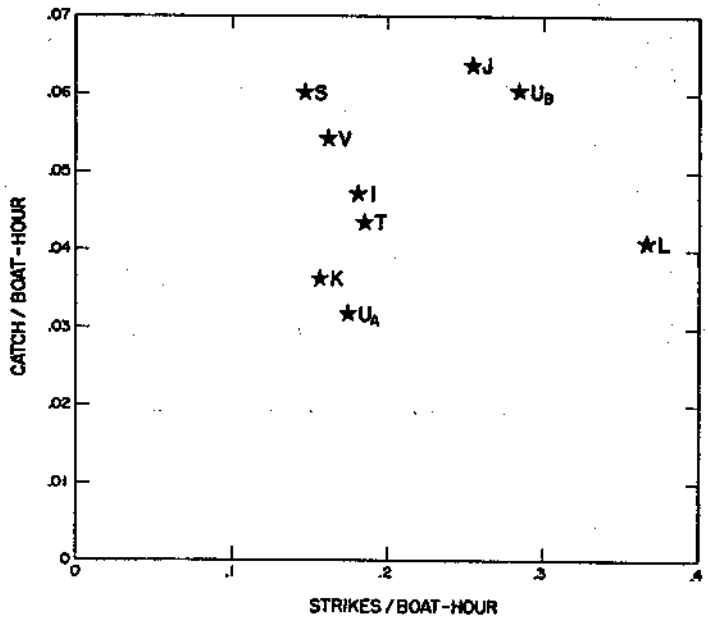


Figure 2.--Plot of catch rates against strike rates. Letters refer to areas.

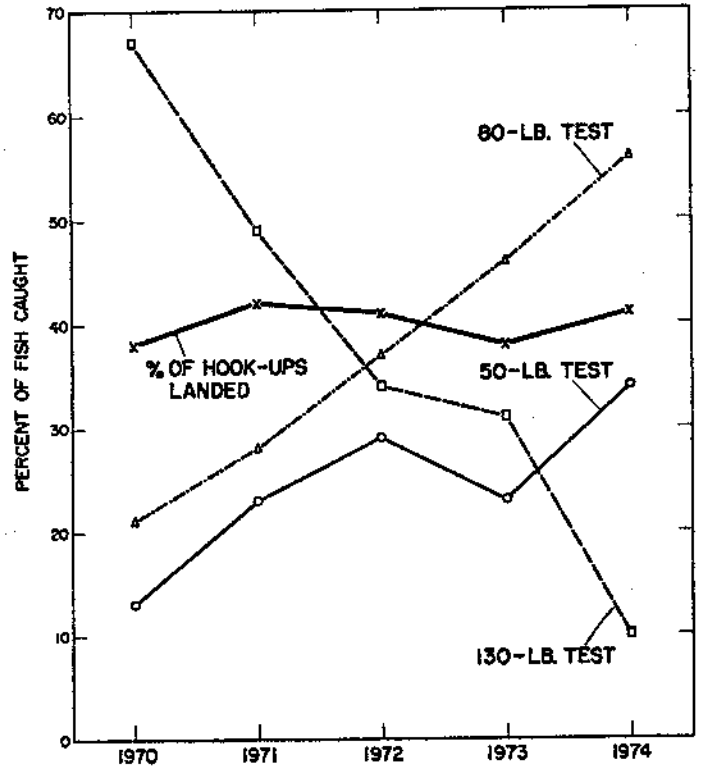


Figure 3.--Proportion of catch landed on various size lines.

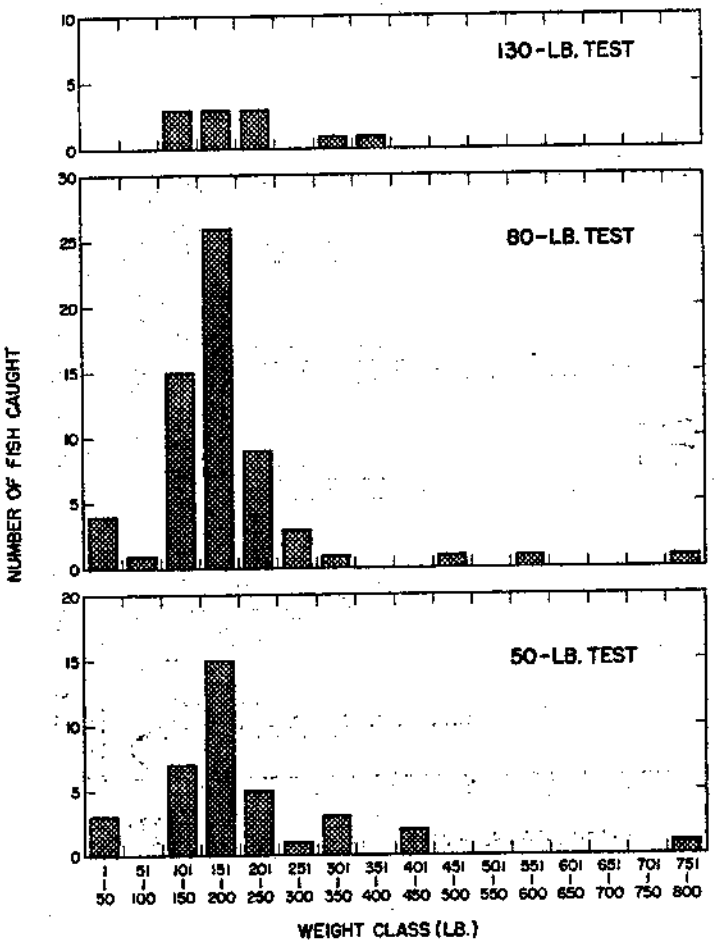


Figure 4.--Frequency distribution of weights of fish caught on various size lines.

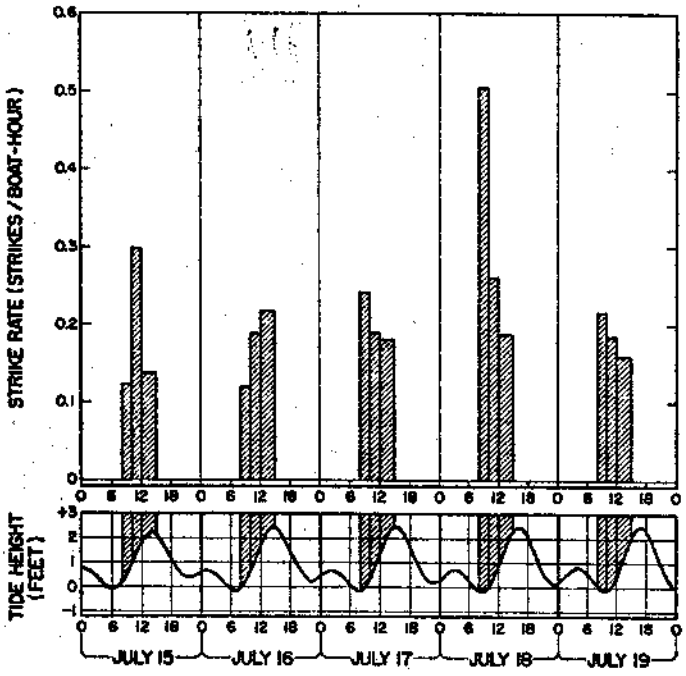
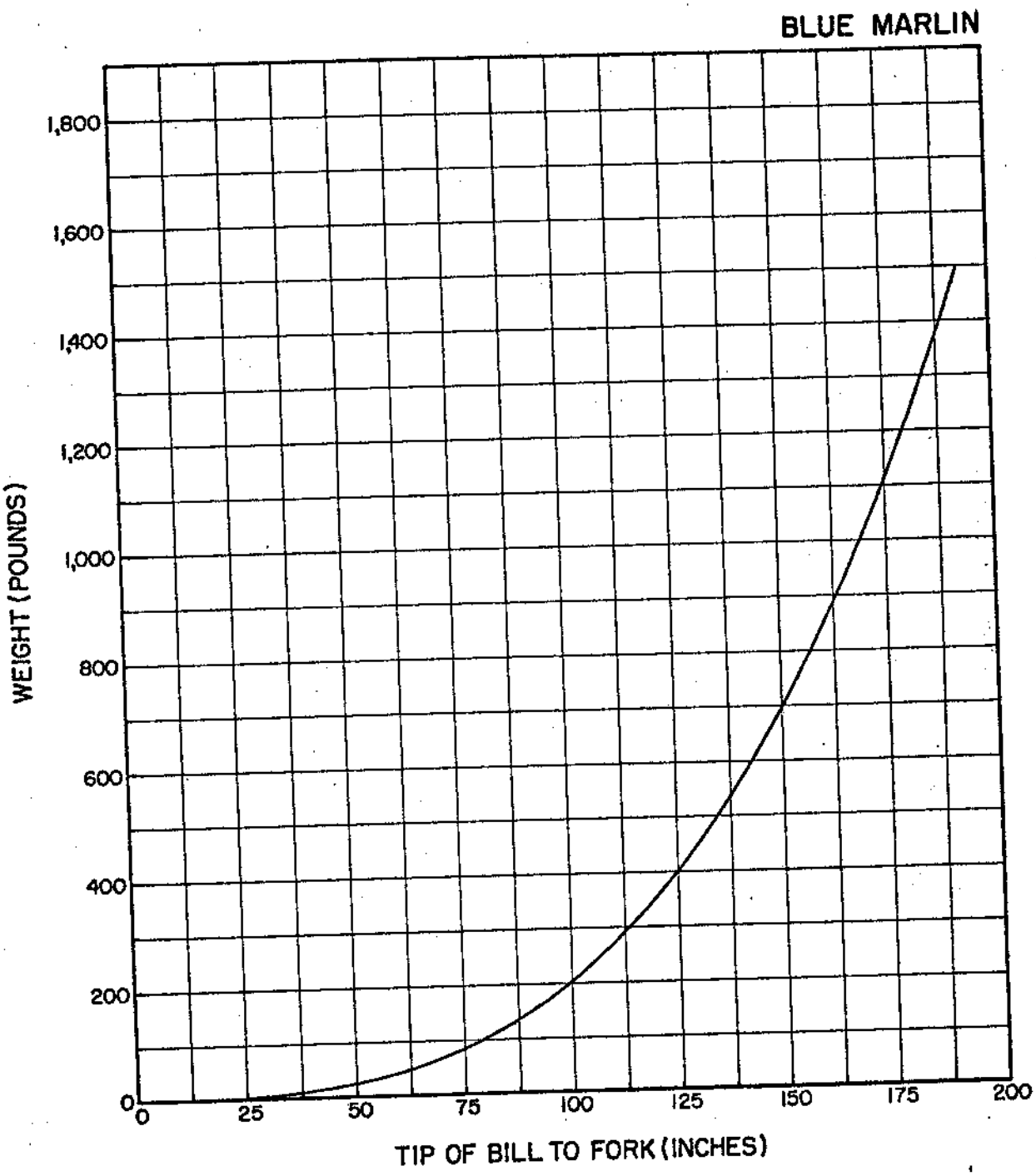
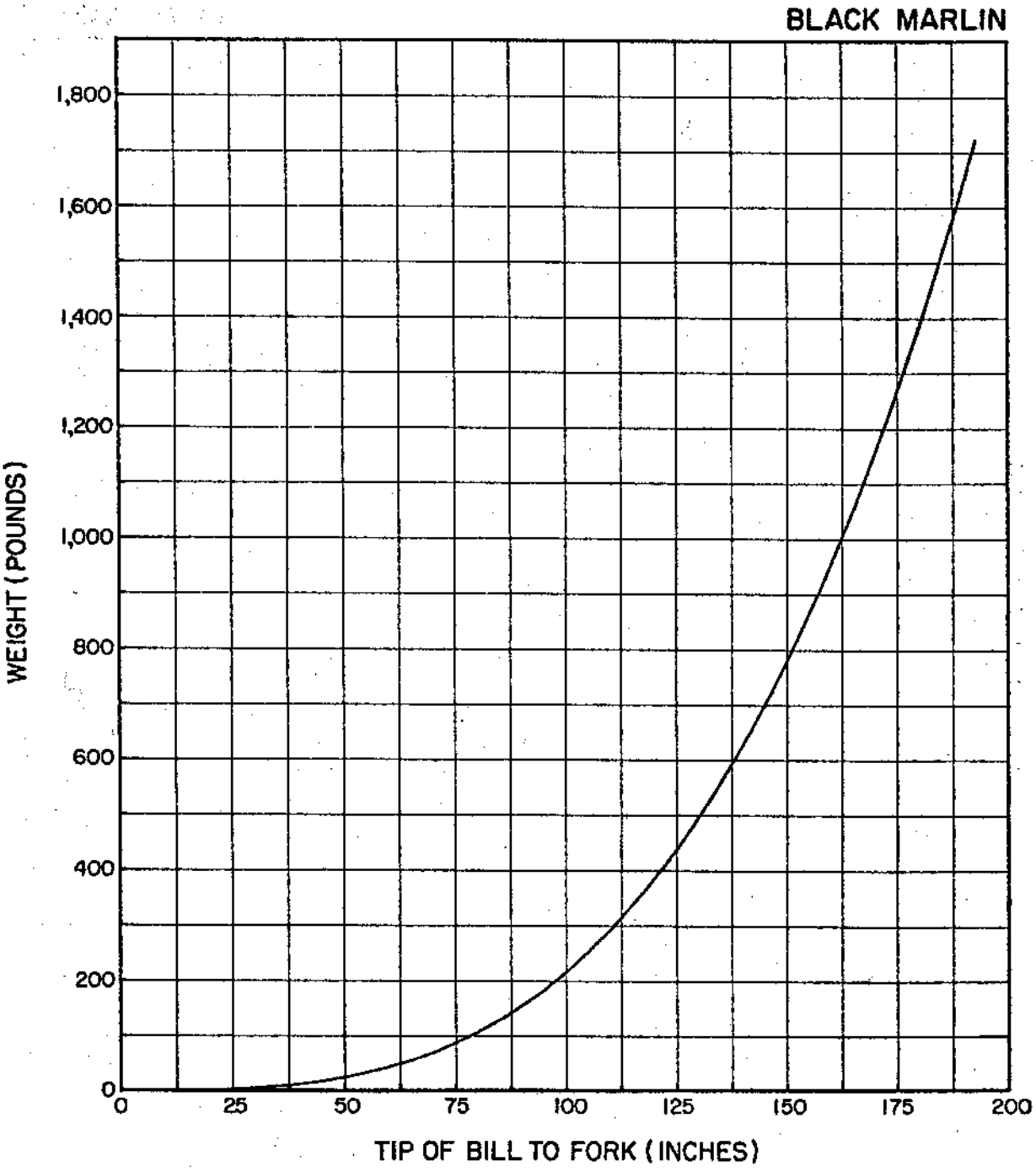
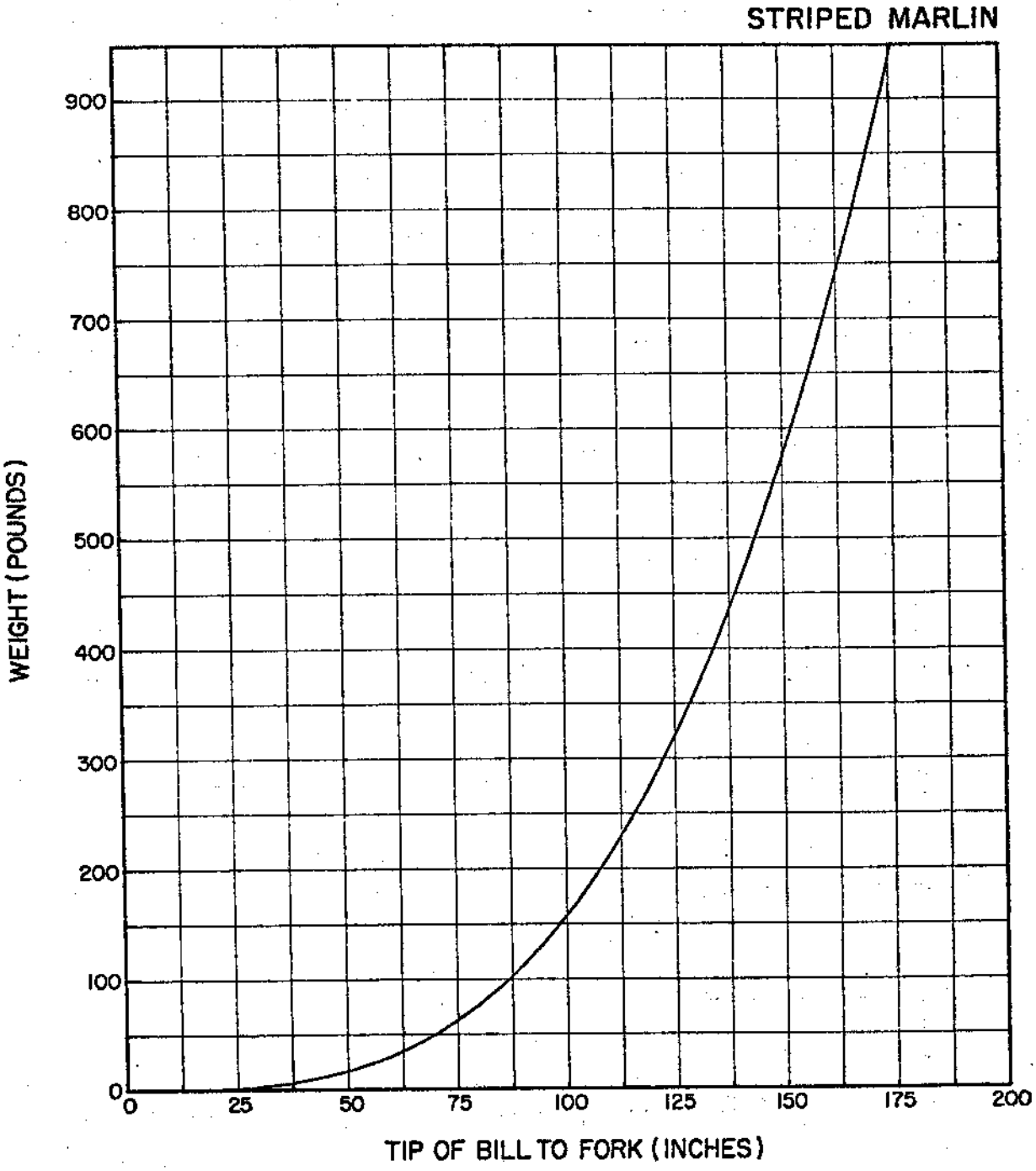
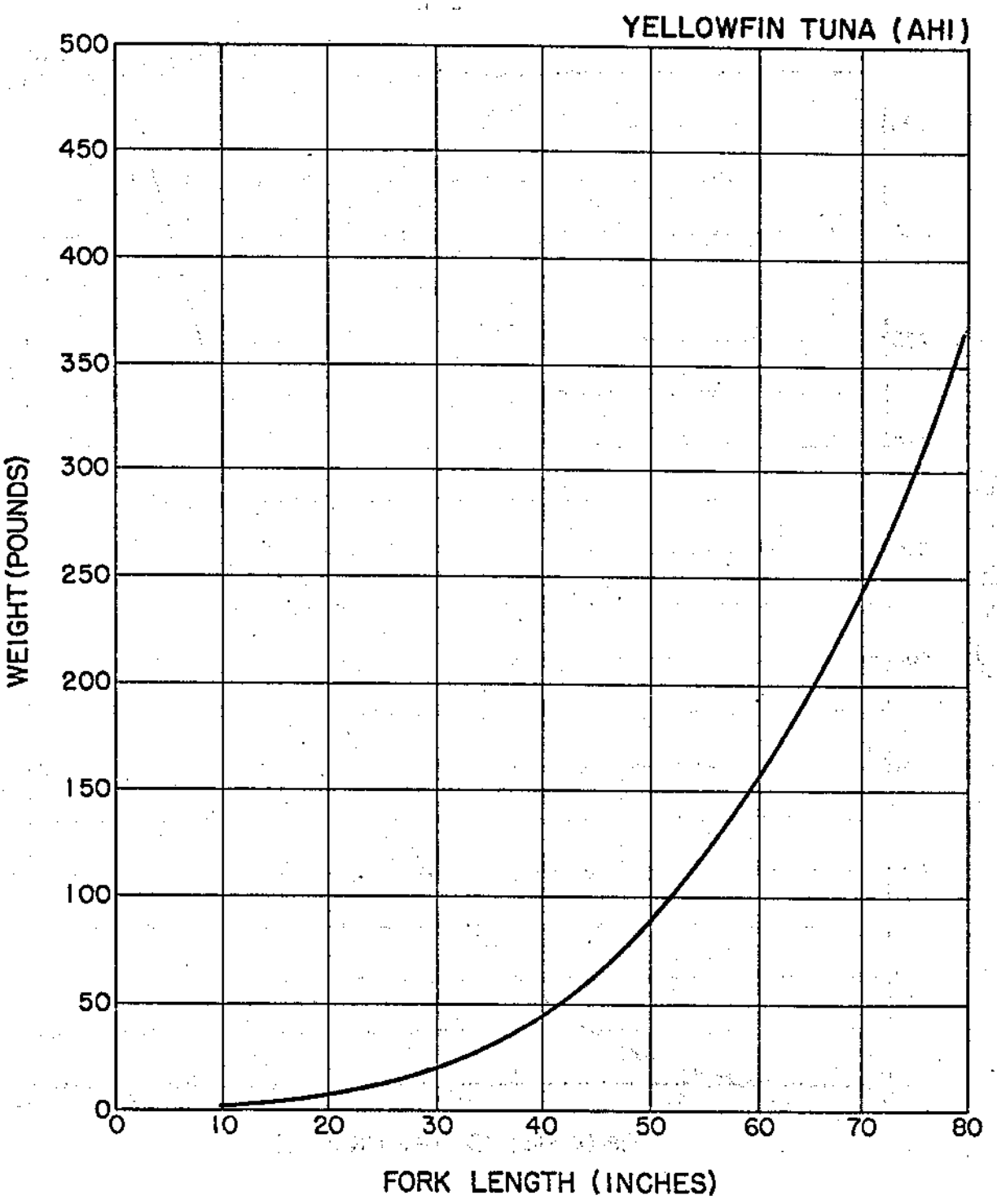


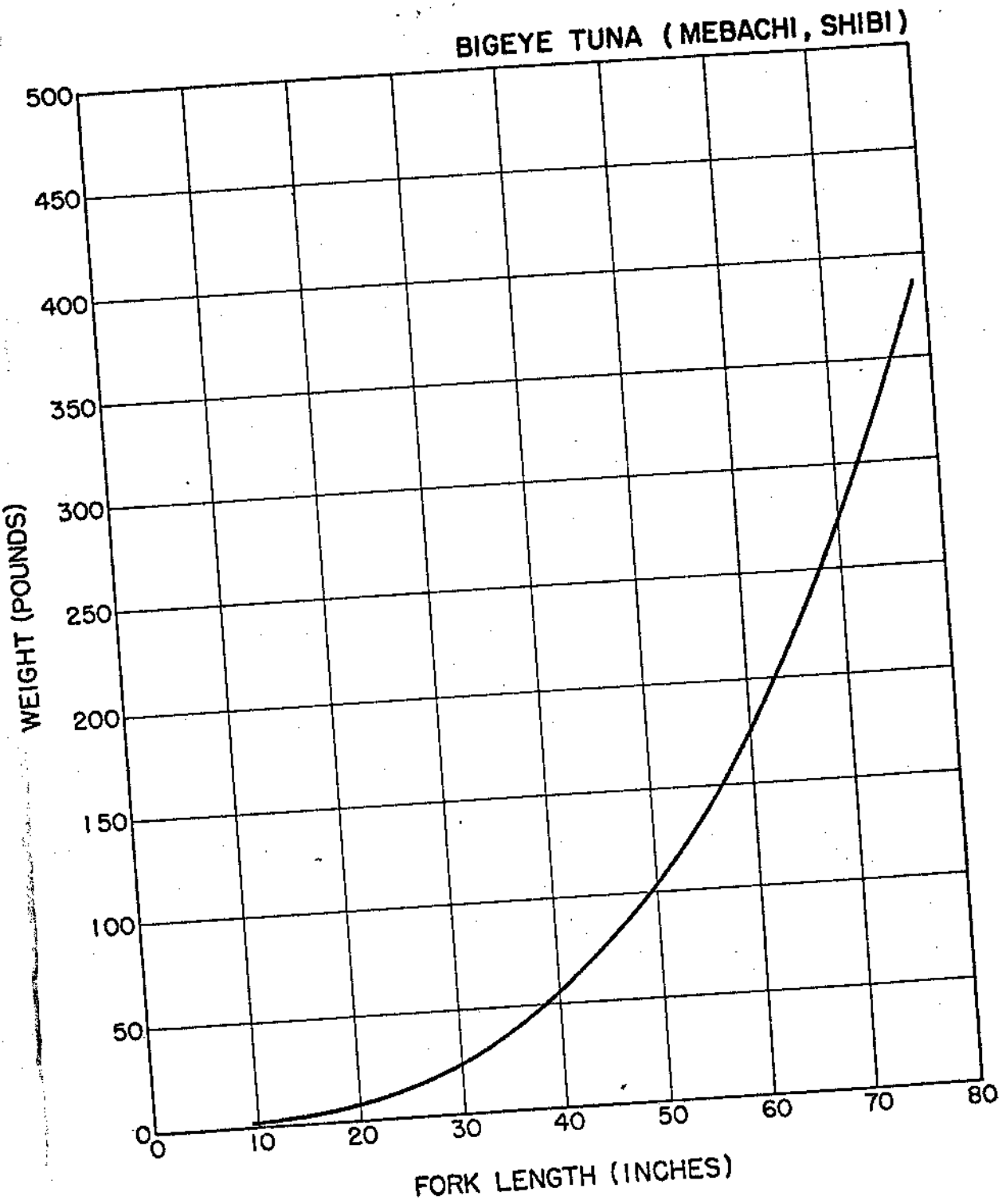
Figure 5.—Strike rates and tide cycle for 1974 HIBT.


BLUE MARLIN
WEIGHT (POUNDS)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
0
25
50
75
100
125
150
175
200
TIP OF BILL TO FORK (INCHES)


BLACK MARLIN
WEIGHT (POUNDS)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
0
25
50
75
100
125
150
175
200
TIP OF BILL TO FORK (INCHES)


STRIPED MARLIN
WEIGHT (POUNDS)
900
800
700
600
500
400
300
200
100
0
0
25
50
75
100
125
150
175
200
TIP OF BILL TO FORK (INCHES)


YELLOWFIN TUNA (AHI)
WEIGHT (POUNDS)
500
450
400
350
300
250
200
150
100
50
0
0
10
20
30
40
50
60
70
80
FORK LENGTH (INCHES)


BIGEYE TUNA (MEBACHI, SHIBI)
WEIGHT (POUNDS)
500
450
400
350
300
250
200
150
100
50
0
0
10
20
30
40
50
60
70
80
FORK LENGTH (INCHES)